

Application No. 10/667,238
Response to Office Action of April 24, 2006

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REMARKS/ARGUMENTS

The specification is amended so as to provide an Abstract of the Disclosure in accordance with Examiner Fortuna's suggestions. Support is found in the original Abstract of the Disclosure as well as throughout the originally filed application. No new matter is believed to be added by the amendment. Applicants thank Examiner Fortuna for his suggestions.

Claims 1-2, 8, 14, and 19 are amended. Support for the amendment to Claims 1, 14, and 19 is found in original Claims 3 and 6. Claim 2 is amended to provide clarity and finds support in the originally filed Claim 2. The amendment to Claim 8 is to merely change dependency. Further, support for all of the above mentioned amendments is found throughout the originally filed application. No new matter is believed to be added by the amendment. Claims 1-30 are pending. Favorable reconsideration is respectfully requested in light of the Remarks below.

Applicants thank Examiner Fortuna for the helpful comments and explanations provided in the outstanding Office Action to aid the Applicants in their response.

The objection to the specification is believed to be obviated by the amendment above. The Abstract of the Disclosure has been amended in accordance with Examiner Fortuna's suggestions. Accordingly, withdrawal of this ground of objection is respectfully requested.

The objection to Claim 1 is believed to be obviated by the amendment above. Claim 1 has been amended in accordance with Examiner Fortuna's suggestions. Accordingly, withdrawal of this ground of objection is respectfully requested.

The rejections of Claims 1-20 under 35 U.S.C. §102 and/or 35 U.S.C. §103 over US Patent No. 1,839,136 (US'136) and/or US Patent No. 3,245,870 (US'870); are traversed below.

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US'136, at best, discloses contacting a solution of alco-glycero-dextrine compound, a borate, an ammonium compound and a magnesium compound with a sheet of felted cellulosic fibers to create a fireproof cellulose material. The Office apparently is equating an alco-glycero-dextrine compound with starch because the alco-glycero-dextrine compound is pre-made by heating/boiling starch with glycerin and a lower alkyl alcohol (such as methyl, ethyl, or denatured ethyl alcohol). Applicants maintain and do not understand, without further explanation from the Office, how an alco-glycero-dextrine compound can possibly be a starch in light of the drastic covalent manipulation disclosed by US'136. While starch is part of the recipe for making the alco-glycero-dextrine compound, this does not inherently make the alco-glycero-dextrine compound a starch. In addition, to achieve the fireproof cellulose material, US'136 discloses that exorbitantly high levels of borate must be used. In fact, the amount of borate is at least 25% based upon the weight of the alco-glycero-dextrine compound. Therefore, even if the Office were to maintain its position that the alco-glycero-dextrine compound is starch, US'136 discloses that high levels of borate must be used to achieve the object of the invention, i.e. fireproofing, described therein. Further, US'136 discloses that to achieve the object of the invention, i.e. fireproofing, the sheet is impregnated with the solution of alco-glycero-dextrine compound, a borate, an ammonium compound and a magnesium compound. Accordingly, US'136 teaches away from controlling the location of the alco-glycero-dextrine compound and boron-containing compound such that greater than 50% of the total amount of alco-glycero-dextrine compound and boron-containing compound is located at or near the surfaces of the sheet.

In direct contrast, the claimed invention relates to a paper or paperboard containing a paper web that contains cellulosic fibers, starch and a boron-containing compound at an

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amount that is equal to or less than about 7% by weight of the starch where greater than 50% of the total amount of starch and boron-containing compound is located at or near the surfaces of the web, as well as methods of making the same. US'136 not only fails to disclose or suggest contacting starch and a boron-containing compound with cellulose fibers, it teaches away from the claimed amounts of boron-containing compound and the location of both the boron-containing compound and starch so as to satisfy its fireproofing objective. Accordingly, not all of the claim limitations are disclosed or suggested by US'136; and, withdrawal of this ground of rejection is respectfully requested.

US'870, at best, discloses blending and diluting fiber with starch and boric acid (among other components) at the fiber dilution chest (See Figures 1 and 2) so as to make a water resistant, fire retardant lignocellulosic product. US'870 fails to disclose, much less appreciate, the importance of locating greater than 50% of the total amount of starch and boron-containing compound at or near the surfaces of the web. Further, in order to achieve the inventive objective (water resistant, fire retardant lignocellulosic product), US'870 discloses that enormous amounts of boric acid must be used. Figure 2 indicates that 8 lbs of boric acid and 0.22 lbs of starch are blended with fibers, while column 7, lines 22-26, disclose that 8% boric acid and 0.22% of starch based upon the dry weight of the board are mixed. Therefore, US'870 discloses a lignocellulosic product contain >3600% boric acid based upon the weight of starch. Accordingly, US'870 teaches that a water resistant, fire retardant lignocellulosic product by having an incredibly high amount of boric acid content relative to the starch content therein.

In direct contrast, the claimed invention relates to a paper or paperboard containing a paper web that contains cellulosic fibers, starch and a boron-containing compound at an

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amount that is equal to or less than about 7% by weight of the starch where greater than 50% of the total amount of starch and boron-containing compound is located at or near the surfaces of the web, as well as methods of making the same. US'870 not only fails to disclose or suggest contacting starch and a boron-containing compound with cellulose fibers in a manner that would place greater than 50% of the total amount of starch and boron-containing compound at or near the surfaces of the web, it actually discloses that large amounts of boron-containing compound relative to that of starch is necessary to satisfy its water- and fire-proofing objective. This disclosure teaches away from using the claimed amounts of boron-containing compound relative to that of starch. Accordingly, not all of the claim limitations are disclosed or suggested by US'870; and, withdrawal of this ground of rejection is respectfully requested.

The rejections of Claims 1-13 and 19 under 35 U.S.C. §102 and/or 35 U.S.C. §103 over KR 2001056213 (KR'213) and/or JP 06-047826 (JP'826) are traversed below.

KR'213, at best, discloses surface treating a dried sheet of paper with a solution containing chitosan and polyvinyl alcohol or starch (see paragraph 9). Therefore, KR'213 disclosed surface treating a dried sheet of paper with a solution containing chitosan and polyvinyl alcohol (PVOH) or a solution containing chitosan and starch. Further, paragraph 12 of KR'213 discloses:

“When the polyvinyl alcohol is used for surface treatment, the treated paper can be, if needed, subjected to an after-treatment with aqueous borax solution or aqueous solution of borax and glycerin to cure the polyvinyl alcohol.”

Accordingly, KR'213 fails to disclose that when the starch is used for surface treatment, the treated paper can be, if needed, subjected to an after treatment with aqueous borax solution.

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In fact, the Examples KR'213 only teach use of an after treatment using borax when the surface treatment solution contains PVOH; and, explicitly eliminates the need for an after treatment using borax when the surface treatment solution contains starch.

In direct contrast, the claimed invention relates to a paper or paperboard containing a paper web that contains cellulosic fibers, starch and a boron-containing compound at an amount that is equal to or less than about 7% by weight of the starch where greater than 50% of the total amount of starch and boron-containing compound is located at or near the surfaces of the web, as well as methods of making the same. KR'213 not only fails to disclose or suggest contacting starch and a boron-containing compound with cellulose fibers in a manner that would place greater than 50% of the total amount of starch and boron-containing compound at or near the surfaces, it teaches away from treating the paper with a combination of starch and boron-containing compound altogether by indicated that PVOH and starch may be applied thereto, but only PVOH may be applied with a boron-containing compound. Accordingly, not all of the claim limitations are disclosed or suggested by KR-213 and one reading this reference would not be motivated to treat a paper with a combination of starch and boron-containing compound in view of this teaching. Therefore, withdrawal of this ground of rejection is respectfully requested.

JP'826 discloses, at best, a fiber plate for building materials and a method of making the same by impregnating a wet fiberboard mat with a boron compound containing solution. The boron compound containing solution does not contain starch. Rather, from 3 to 10wt% of starch is mixed with at least 45wt% mineral matter fiber and from 25 to 50wt% organic fiber to produce the wet mat, followed by the impregnation of this mat with the boron compound containing solution in a manner to impregnate from 5 to 50wt% of a boron

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compound into the material. First, JP'826 fails to disclose a paper or paperboard containing greater than 50% of the total amount of both starch and boron-containing compound at or near the surfaces of a web. Further, JP'826 discloses impregnating a minimum of 5wt% of a boron compound into the material. However, the starch may be present at most 10wt%. Therefore, the boron compound may be present at a minimum amount that is $5/10 = 50\text{w\%}$ by weight of the starch. Therefore, JP'826 not only fails to disclose a paper or paperboard containing greater than 50% of the total amount of both starch and boron-containing compound at or near the surfaces of a web, but also fails to disclose or suggest that the boron-containing compound is present at an amount that is equal to or less than about 7% by weight of the starch.

In direct contrast, the claimed invention relates to a paper or paperboard containing a paper web that contains cellulosic fibers, starch and a boron-containing compound at an amount that is equal to or less than about 7% by weight of the starch where greater than 50% of the total amount of starch and boron-containing compound is located at or near the surfaces of the web, as well as methods of making the same. JP'826 not only fails to disclose a paper or paperboard containing greater than 50% of the total amount of both starch and boron-containing compound at or near the surfaces of a web, but also fails to disclose or suggest that the boron-containing compound is present at an amount that is equal to or less than about 7% by weight of the starch. Accordingly, not all of the claim limitations are disclosed or suggested by JP'826 and one reading this reference would not be motivated to treat a paper with a combination of starch and boron-containing compound in view of this teaching to achieve the presently claimed invention. Therefore, withdrawal of this ground of rejection is respectfully requested.

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The rejections of Claims 1-18 under 35 U.S.C. §102 and/or 35 U.S.C. §103 over EP 0148647 (EP'647) are traversed below.

EP'647 discloses, at best, a substrate made from a cellulose-containing suspension further containing an organic polymer such as starch and an inorganic oligomer such as a silica sol, zirconium chloride, and titanyl sulfate so as to achieve increased ash retention therein the resultant substrate. While EP'647 discloses one example of a substrate made from a suspension containing cellulose, a boron compound and starch; it fails to disclose or suggest that the starch and the boron compound are positioned in the substrate such that greater than 50% of the total amount of both starch and boron-containing compound at or near the surfaces of a web. Further, EP'647 actually teaches away from using the boron compound with starch because the boron compound does not help retain ash in the substrate at all.

Sample 5 of Figure 5 in EP'647 is the only example that contains starch and a boron compound; and, this Sample 5 clearly demonstrates that a substrate containing a boron compound and starch fails altogether to have increased ash retention. Meanwhile, Figure 5 demonstrates that substrates containing starch and silica sol, zirconium chloride, or titanyl sulfate do have increased ash retention. Accordingly, EP'647 discloses that it is undesirable to make a paper from a suspension containing fiber, boron compound and starch.

In direct contrast, the claimed invention relates to a paper or paperboard containing a paper web that contains cellulosic fibers, starch and a boron-containing compound at an amount that is equal to or less than about 7% by weight of the starch where greater than 50% of the total amount of starch and boron-containing compound is located at or near the surfaces of the web, as well as methods of making the same. EP'647 not only fails to disclose a paper or paperboard containing greater than 50% of the total amount of both starch

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and boron-containing compound at or near the surfaces of a web, but also teaches away making a paper from a suspension containing cellulose, starch, and a boron compound altogether. Accordingly, not all of the claim limitations are disclosed or suggested by EP'647 and one reading this reference would not be motivated to treat a paper with a combination of starch and boron-containing compound so as to produce a substrate containing the starch and boron-containing compound at the claimed amounts and at the claimed locations across the cross section of the substrate. Therefore, withdrawal of this ground of rejection is respectfully requested.

For all of the above reasons, Applicants respectfully request that the above-mentioned rejections be withdrawn.

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Applicants respectfully submit that the present application is now in condition for allowance. Favorable reconsideration is respectfully requested. Should anything further be required to place this application in condition for allowance, the Examiner is requested to contact below-signed by telephone.

Please charge the amount of **\$120.00** required for the request for extension of time to our Deposit Account No. 09-0525. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R. 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 09-0525. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time.

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